TECHNICAL SCHEDULE II

PROPOSED PLANT DETAILS

(To be completed by the Bidder)

Name of the STP	

Notes:

1) Bidder shall complete the Separate TECHNICAL SCHEDULE II for STP and TSPS.
2) Sizes of process and civil units shall mean Length x Width x Depth/Height as applicable and shall be expressed in "metres" unless specified otherwise.
3) Bidder shall furnish all the details in table and no part of the table is allowed to write "During Detailed Engineering".
4) Bidder shall write "NIL" wherever not applicable to the respective plant depending upon the process requirement as specified in Part 5.
5) All Equipment shall be of reputed make and shall qualify the criteria as mentioned in Part 8, General Mechanical Requirements of Tender document.
6) Original Vendor catalogue shall be included for Trash Screens, Coarse Screens, TSPS Pumps, , Fine Screens, Vortex Grit Chamber, Submersible Mixers, MLR Pumps, Air Diffusers, Air Blowers, RAS Pumps, Centrifuge Feed Pumps and Centrifuge.

3.1 Mechanical Works for STP

3.1.1 Mechanical Fine Screen – Bar Screen

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)	Nos.	
	(iv) Type		
	(v) Auto jam removal system		Yes/No
(b)	**Screen**		
	(i) Clear Spacing	mm	
	(ii) Width	mm	
	(iii) Height	mm	
	(iv) Raking speed	m/min	
	(v) Motor rating	kW	
	(vi) Water Level	m	
(c)	**Materials of Construction** (i) Frame		
	(ii) Rake carriage		
	(iii) Screen bars		
	(iv) Fasteners		

S. No.	Description	Units	Particulars
	(v) Canopy		
(d)	**Screw Conveyor System**		
	(i) Make		
	(ii) Material		
	(iii) Speed	rpm	
	(iv) Motor rating	kW	
	(v) Size of screw	mm	
	(vi) Angle of screw	deg	
(e)	**Unit Control Panel** (i) Make		
	(ii) Over all dimensions	mxmxm	
	(iii) Degree of protection		
	(iv) Timer		
	• Make • Type		

3.1.2 Vortex Type Grit Removing Equipment

S. No.	Description	Units	Particulars
1	Manufacturer		
2	Country of origin		
3	Type & Model		Vortex grit mechanism
4	No. of units	Nos	
5	Design flow for each Unit		
	Minimum		
	Maximum		
	Design		
6	Grit design Load	m3/month	
7	Settled grit specific gravity		
8	Guaranteed removal rate	%	
9	Turndown Ratio of grit chamber		
	Grit chamber		
1	Degree of Grit Chamber		
2	Dia of Upper Chamber	mm	
3	Upper Chamber Depth	mm	
4	Dia of Lower Chamber	mm	
5	Lower Chamber Depth	mm	
6	Inlet & effluent channel width	mm	
7	Total Depth	mm	
8	Grit Hopper Storage Volume	m^3	

S. No.	Description	Units	Particulars
9	MOC of main internals under water		
10	**Head loss across the grit mechanism**		
	Minimum		
	Maximum		
	Design		
11	**Upstream Velocity**		
	Minimum		
	Maximum		
	Design		
A	**Vortex Drive Motor**		
1	Manufacturer		
2	Country of origin		
3	No. of units		
4	Type		
5	Power	kW	
6	Rotary speed of output shaft	rpm	
7	Rotary speed of motor shaft	rpm	
8	Efficiency at duty point	%	
9	Total efficiency pump and motor	%	
10	Degree of protection	IP	
11	Weight per unit	kg	
12	Protections needed		
13	Weight per unit	kg	
B	**Grit Pump**		
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos.	
4	Store Standby		
5	Type: Flooded Suction / Top Mounted		
6	Capacity of the pump	m^3/h	
7	Delivery head (after all losses - bends & horizontal piping)	m WC	
8	Efficiency	%	
9	Power demand at shaft	kW	
10	Solids handling	mm	
11	Weight per unit	kg	
Material			
1	Pump housing		
2	Motor housing		
3	Propeller hub		
4	Impeller		

S. No.	Description	Units	Particulars
5	Shaft		
6	Shaft seal pump side		
7	Shaft seal motor side		
8	Impeller type		
Motor			
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos	
4	Type		
5	Nominal power	kW	
6	Efficiency at duty point	%	
7	Total efficiency pump and motor	%	
8	Degree of protection	IP	
9	Weight per unit	kg	
10	Protections needed		
C	**Grit Classifier**		
1	Manufacturer		
2	Country of origin		
3	No. of units	No.	
4	Type		
5	Throughput capacity	m^3/h	
6	Dryness of the grit	%	
7	Sand output rate	m^3/h	
8	Organic content in the final dewatered grit (from the outlet of grit classifier)	%	
9	Weight of the Unit	Kgs	
Dimensions			
1	Total height	mm	
2	Total length	mm	
3	Height of sand discharge	mm	
4	Height of tank	mm	
5	Width of tank	mm	
6	Inclination of spiral	Deg	
Materials			
1	Tank		
2	Covers		
3	Spiral		
4	Wear rails		
Motor			
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos	

S. No.	Description	Units	Particulars
4	Type		
5	Nominal power	kW	
6	Efficiency at nom. point		
7	Motor input speed	rpm	
8	Motor output speed	rpm	
9	Degree of protection	IP	
10	Starting method		
11	Ex. classification		
12	Weight per unit	kg	
13	Protections needed		

3.1.3 Air Blower for Vortex Type Grit Removing Equipment

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Capacity at NTP	m^3/min	
	(v) Design maximum discharge pressure	mlc	
	(vi) Efficiency	%	
	(vii) Speed, blower	rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	rpm	
	(xi) Noise level at Duty Point in dB(A) at 1.86 m from the unit	dB(A)	
	(xii) Vibration	mm/sec	
	(xiii) With Acoustic Hood	dB(A)	
	(xiv) Without Acoustic Hood	dB(A)	
	(xv) Weight – Blower	kgs	
	(xvi) Maximum lifting weight	kgs	
	(xvii) Dimensions (L x W x H)	m x m x m	
	(xviii) Coupling Type		
	(xix) Coupling Make		
	(xx) Cooling System		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Common Base frame		
	(v) Orientation		
(c)	**Acoustic Hood:**		
	(i) Type		

S. No.	Description	Units	Particulars
	(ii) Material of Construction		
(d)	**Inlet/Outlet silencer**		
	(i) Type		
	(ii) Make		
	(iii) Filter media		
	(iv) Mean air velocity	m/s	
(e)	**Noise reduction (mean) Air release valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Set pressure	bar	
	(v) Make		
(f)	**Delivery non-return valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		
(g)	**Delivery isolation valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		

3.1.4 Clarifiers

S. No.	Description	Units	Particulars
(A)	**<u>Secondary Clarifiers</u>**		
(a)	**<u>General</u>**		
	(i) Number		
	(ii) Flow per clarifier	cum/hr	
	(iii) Diameter	M	
	(iv) Up flow rate	m/h	
	(v) Liquid depth each	M	
	(vi) Free board	M	
	(vii) Volume	Cum	
	(vii) Safety device		
(b)	**Scraping mechanism:**		
	(i) Make		
	(ii) Type		
	(iii) Size (Diameter x SWD x FB)	m x m x m	
	(iv) Scraper speed	rpm	
	(v) Peripheral velocity	m/sec	
	(vi) Torque rating	N-m	
	(vii) Feed rate per Clarifier	cum/hr	

S. No.	Description	Units	Particulars
	(viii) Feed well size	Mm	
	(ix) Walkway (width x Height)	Mm	
	(x) Weir plate size (Thick x width)	Mm	
(c)	**Speed Reduction Drive**		
	(i) Make		
	(ii) Type		
	(iii) Speed Reduction Ratio		
	(iv) Torque		
	(v) Lubrication Type		
(d)	**Surface preparation & Protection:**		
	(i) Wetted parts		
	(ii) Exposed parts		
(e)	**Material of construction:**		
	(i) Bridge and Superstructure		
	(ii) Feed well		
	(iii) Walkway Chequered Plates		
	(iv) Squeegees		
	(v) Weir plate		
	(vi) Clamps & Hardware		
(f)	**Motor :**		
	(i) Motor rating	kW	
	(ii) Motor speed	Rpm	
	(iii) Motor Make		
	(iv) Protection		

3.1.5 Secondary Scum Pump set

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	No.s	
(b)	**Performance**		
	(i) Capacity	cu.m/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	

S. No.	Description	Units	Particulars
(c)	**Materials of Construction**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Mechanical Seal		
	(v) Lifting Chain and Guide Bar		
	(vi) Delivery pipe and diameter		
	(vii) Cooling Jacket		
(d)	Weight	Kgs	
(e)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

3.1.6 Submersible Mixer

S. No.	Description	Units	Particulars			
			Anaerobic Zone	**Anoxic Zone**	**De-Aeration Zone**	**Centrifuge feed Sump**
(a)	**Submersible Mixer**					
	(i) Make					
	(ii) Type					
	(iii) Model					
	(iv) Quantity (W+S)	Nos.				
(b)	**Material of construction**					
	(i) Casing					
	(ii) Impeller					
	(iii) Shaft					
	(iv) Mechanical seal					
	(v) Guide mechanism with winch					
	(vi) Wire Rope					
	(vii) Lifting Davit					

S. No.	Description	Units	Particulars			
			Anaerobic Zone	**Anoxic Zone**	**De-Aeration Zone**	**Centrifuge feed Sump**
(c)	**Design/Construction features**					
	(i) Impeller Diameter	mm				
	(ii) Rotation speed	rpm				
	(iii) Immersion depth	mm				
	(iv) Absorbed power	kW				
	(v) Motor rating	kW				
	(vi) Maximum Lifting weight	kgs				

3.1.7 Fine Bubble Air Diffusers

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Diffuser OD x Length	mm x mm	
	(v) Aeration/Basin Dimensions (L x W x SWD)	mm x mm	
	(vi) Design Air-Flow per Aeration/Basin (Maximum/Average)	Nm^3/hr	
	(vii) Quantity per Aeration/Basin	No.	
	(viii) Quantity in Aeration Basin Zone 1/Zone 2/...	No.	
	(ix) Weight per Diffuser	Kg	
	(x) Design air flow per diffuser	m^3/hr	
	(xi) Efficiency per diffuser	%	
(b)	**Diffuser Membrane**		
	(i) Type-self cleaning (Yes/No)		
	(ii) No. of Membranes - Total	No.	
	(iii) Membrane Material		
	(iv) Means of attachment		
	(v) Membrane OD X Length	mm x mm	
	(vi) Pore size (Average)	mm	

S. No.	Description	Units	Particulars
	(vii) No. of Pores per length of Diffuser	No./m	
	(viii) Bubble size (Average)	mm	
(c)	**Diffuser Assembly**		
	(i) Make		
	(ii) Type		
	(iii) Length x Width	mm x mm	
	(iv) Material of Construction		
	(v) Coupling Type • Make • Model/Size		
	(vi) Diffuser Assembly Weight	Kg	
(d)	**Materials of Construction**		
	(i) Diffuser Tube		
	(ii) Membrane		
	(iii) Pipe clamps & Hardware		
	(iv) Pipe Grid		
(e)	**Performance**		
	(i) SOTE Oxygen transfer rate • Clear water • Field	%	
	(ii) Zone of influence	m	
	(iii) Zone of oxygenation	m	
	(iv) Depth of mixing	m	
	(v) Velocity thro' the Diffuser	m/sec	
	- Diffuser Head loss & Efficiency V/s Submergence - Curve attached Diffuser Grid Drawing with retrievable arrangement details attached	Yes/No Yes/No	

3.1.8 Process Air Blowers

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Capacity at NTP	m^3/min	
	(v) Design maximum discharge pressure	mlc	

S. No.	Description	Units	Particulars
	(vi) Efficiency	%	
	(vii) Speed, blower	rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	rpm	
	(xi) Noise level at Duty Point in dB(A) at 1.86 m from the unit	dB(A)	
	(xii) Vibration	mm/sec	
	(xiii) With Acoustic Hood	dB(A)	
	(xiv) Without Acoustic Hood	dB(A)	
	(xv) Weight – Blower	kgs	
	(xvi) Maximum lifting weight	kgs	
	(xvii) Dimensions (L x W x H)	m x m x m	
	(xviii) Coupling Type		
	(xix) Coupling Make		
	(xx) Cooling System		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller/Lobe		
	(iii) Shaft		
	(iv) Common Base frame		
	(v) Orientation		
(c)	**Acoustic Hood:**		
	(i) Type		
	(ii) Material of Construction		
(d)	**Inlet/Outlet silencer**		
	(i) Type		
	(ii) Make		
	(iii) Filter media		
	(iv) Mean air velocity	m/s	
(e)	**Noise reduction (mean) Air release valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Set pressure	bar	
	(v) Make		
(f)	**Delivery non-return valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		
(g)	**Delivery isolation valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		

S. No.	Description	Units	Particulars
	(iv) Make		

3.1.9 Induction Motor for Process Air Blowers

Sr. No.	Description	Unit	Particulars
(a)	Make		
(b)	Type Designation		
(c)	Rating	kW	
(d)	Particulars at rated voltage and frequency :		
(i)	Starting time	Sec.	
(ii)	Starting current	% FL	
(iii)	Pull-out torque	% FLT	
(iv)	Pull-up torque	% FLT	
(e)	Minimum voltage required under starting conditions to accelerate driven equipment to rated speed.	Volts	
(f)	Starting time at specified minimum starting voltage	Sec.	
(g)	Permissible running time at full load at minimum allowable voltage	Min.	
(h)	Locked rotor current withstand time (safe stall time) at 110% rated voltage		
(i)	At rated temp. (Hot)	Sec.	
(ii)	When cold	Sec.	
(i)	Stator thermal time constant	Sec.	
(j) (i)	Permissible no. of equally spread starts per hour under normal service conditions	No.	
(ii)	Permissible no. of starts in quick succession with cold machine at room temperature	No.	
(iii)	Permissible no. of hot restarts	No.	
(iv)	Starts per 8 hour period and 24 hour period	No.	
(k)	Space Heaters :		
(i)	Rated voltage, no. and location	Volts	
(ii)	Rating (Total)	KW	

Sr. No.	Description	Unit	Particulars
(l)	Terminal box:		
(i)	Fault withstand capacity at rated voltage and duration	MVA for Secs.	
(m)	Insulation treatment		
(n)	**Embedded temperature detectors**		
(i)	Make & Type		
(ii)	Number		
(iii)	Resistance at 0^o C	Ohm	
(o)	**Efficiency**		
(i)	Full Load		
(ii)	¾ Load		
(iii)	½ Load		
(iv)	At duty point		
(p)	**Power factor**		
(i)	Full Load		
(ii)	¾ Load		
(iii)	½ load		
(q)	Total guaranteed losses comprising iron loss, copper loss, friction, windage and stray losses	kW	
(i)	Break up : Iron loss	kW	
(ii)	Copper loss	kW	
(iii)	Friction, windage and stray losses	kW	
(r)	**Motor bearings**		
(i)	Permissible temperature rise for bearings	^{O} C	
(ii)	Design ambient temperature assumed for above	^{O} C	
(s)	Motor bearing lubrication system self lubrication / forced oil lubrication		
(t)	**Stator core temperature detectors**		
(i)	Type and Make		
(ii)	Number		
(iii)	Resistance at 0^o C	Ohm	
(u)	Permissible Vibration limits	mm/sec	
(v)	Wr^2 Value	kg-m^2	
(w)	Weight	Kg	

3.1.10 Mixed Liquor Recycle Pump set

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	No.s	
	(v) Tubular Installation		Yes/No
(b)	**Performance**		
	(i) Capacity	cu.m/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Mechanical seal		
	(v) Delivery pipe and diameter		
	(vi) Guide wire/rope & Lifting Chain		
	(vii) Dia of the tube/pipe & MOC		
(d)	Weight	Kg	
(e)	Accessories as specified (Provided / Not provided)		
(f)	Testing & Inspection:		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

3.1.11 Return Activated Sludge Pump Set

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		

S. No.	Description	Units	Particulars
	(iv) Quantity (W+S)	No.s	
(b)	**Performance**		
	(i) Capacity	cu.m/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Delivery pipe and diameter		
	(v) Mechanical Seal		
	(vi) Cooling Jacket		
(d)	Weight	Kg	
(e)	Accessories and piping as specified (Provided / Not provided)		
(f)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	
(g)	**Motor :**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Rating	kW	
	(vi) Weight	kgs	

3.1.12 Alum Dosing Pumps

S. No.	Description	Units	Particulars
(a)	**Pumps**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Model		
	(v) Capacity max/min	l/s	
	(vi) Head	mlc	
	(vii) Stroke adjustment	mm	

S. No.	Description	Units	Particulars
	(viii) Stroking speed max/min	spm	
	(ix) Casing material		
	(x) Diaphragm material		
	(xi) Shaft material		
	(xiii) Motor rating	kW	
	(xiv) Motor Make		
(b)	**Alum preparation Tank:**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)	Nos.	
	(iv) Size (Diameter x Height)	m x m	
	(v) Material of construction		
(c)	**Alum solution mixer**:		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos.	
	(v) Motor rating	kW	
	(vi) Motor speed	rpm	
	(vii) Mixer speed	rpm	
	(viii) Impeller material		
	(ix) Shaft material		

3.1.13 Chlorination System

S.No.	Description	Units	Particulars
(a)	**Automatic Changeover Device**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Model		
(b)	**Chlorinator**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Model		
	(v) Max capacity	kg/hr	
	(vi) Min Capacity	kg/hr	
	(vii) Accuracy as a percent of actual rate in the operating range	±%	
	(viii) Details of Instruments mounted		
	(ix) Cabinet Material		
(c)	**Chlorine load Cell (weighing scale)**		

S.No.	Description	Units	Particulars
	(i) Make		
	(ii) Type		
	(iii) Range		
	(iv) Quantity (W+S)		
(d)	**Chlorine leak detector**		
	(i) Make		
	(ii) Type		
	(iii) Range		
	(iv) Quantity (W+S)		
	(v) Location		
	(vi) Adjustable range of Alarm		
	(vii) State whether separate alarms for leak detection and leak detector equipment failure are provided		
(e)	**Chlorine Tonners and Roller supports**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S) - Chlorine tonners - Roller supports	Nos	
	(iv) Tonner capacity	Kgs	
	(v) Material of construction:		
	- Body		
	- Rollers		
	- Bush		
(f)	**Liquid Chlorine Pipe work, valves and fittings:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Rating		
(g)	**Material of construction:**		
	(i) Pipe		
	(ii) Fittings		
	(iii) Valves		
	(iv) Type		
	(v) Body		
	(vi) Shaft		
	(vii) Plug/Disc/Diaphragm		
(h)	**Valve Actuator:**		
	(i) Make		
	(ii) Type		
	(iii) Model		
(i)	**Pressure Gauges:**		
	(i) Make		

S.No.	Description	Units	Particulars
	(ii) Type		
	(iii) Range		
(j)	**Gas Chlorine Pipe work, valves and fittings:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Rating		
(k)	**Material of construction:**		
	(i) Pipe		
	(ii) Fittings		
	(iii) Valves		
	(iv) Type		
	(v) Quantity		
	(vi) Body		
	(vii) Shaft		
	(viii) Plug/Disc/Diaphragm		
(l)	**Valve Actuator:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model		
(m)	**Pressure Gauges:**		
	(i) Make		
	(ii) Type		
	(iii) Range		
(n)	**Chlorine Ejectors:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model	Nos.	
	(v) Rating		
	(vi) Material of construction :		
	(vii) End connections		
(o)	**Tonner lifting Beam with Hooks**		
	(i) Make		
	(ii) Quantity (W+S)		
	(iii) Material of construction		
(p)	**Chlorine Tonner weighing equipment**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Range		
	(v) Accuracy		

S.No.	Description	Units	Particulars
(q)	**Safety Equipment:**		
	(i) Make:		
	(ii) Quantity:		
	(iii) Type:		
	(iv) Self contained breathing apparatus quantity		
	(v) Positive air-line breathing apparatus quantity		
	(vi) Instant action resuscitators quantity		
	(vii) Safety clothing complete set quantity		
	(viii) Emergency showers quantity		
	(ix) Eye Baths quantity		
	(x) Portable compressor, recharging cylinder, quick release coupling complete set quantity		
(r)	**Chlorine Gas scrubber :**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) MOC of Tower		
	(vi) Weight	kg	
	(vii) Capacity	Kgs	
	(viii) Caustic pump capacity/head	Cum/hr/ m	
	(ix) Type & Make		
	(x) Motor Rating	kW	
	(xi) MOC of Caustic Pump		
	- Casing		
	- Impeller		
	- Shaft		
	(xii) Blower capacity/pressure	Cum/hr/ bar	
	(xiii) Type & Make		
	(xiv) MOC of Blower		
	- Casing		
	- Impeller		
	- Shaft		
	(xv) Agitator in the tank		Yes/No
	(xvi) Type & Make		
	(xvii) MOC of agitator		
	(xviii) Motor Rating	kW	

3.1.14 Chlorine Booster Pump

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	No.s	
(b)	**Performance**		
	(i) Capacity	cum/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Shaft Sleeve		
	(v) Mechanical Seal		
	(vi) Base Plate		
	(vii) Delivery pipe and diameter		
(d)	Weight	Kgs	
(e)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

3.1.15 Chlorine Building Ventilation

S. No.	Description	Units	Particulars
	Chlorine cylinder room		
(a)	**Exhaust fans:**		
	(i) Make		
	(ii) Model		
	(iii) Quantity(W+S)		
	(iv) Capacity	m^3/s	
	(v) Speed	rpm	
	(vi) Motor rating	kW	
(b)	**Ducting :**		
	(i) Standard		

S. No.	Description	Units	Particulars
	(ii) Type		
	(iii) Dimension	m x m	
	(iv) Material		
(c)	**Chlorinator Room:**		
	(i) Exhaust fans		
	(ii) Make		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Capacity	m^3/s	
	(vi) Speed	rpm	
	(vii) Motor rating	kW	
(d)	**Ducting :**		
	(i) Standard		
	(ii) Type		
	(iii) Dimension	m x m	
	(iv) Material		

3.1.16 EOT Crane

S. No.	Description	Units	Particulars
(a)	**EOT Crane**		**Process Air Blower Room**
	(i) Make		
	(ii) Type and class		
	(iii) Safe working Load	tonne	
	(iv) Hoist speed high/low	m/min	
	(v) Long Travel speed	m/min	
	(vi) Cross travel speed	m/min	
	(vii) Span	m	
(b)	**Hoisting Rope:**		
	(i) Diameter	mm	
	(ii) Construction		
	(iii) Quality of steel		
	(iv) Minimum Breaking Load	kgs	
	(v) Factor of safety		
(c)	**Motors for Hoist/Long travel/cross travel :**		
	(i) Make		
	(ii) Type		
	(iii) Rating	kW	
(d)	**Details of Brakes for Hoist/cross travel/Long travel:**		
	(i) Make		
	(ii) Design Holding Torque	N-mm	
	(iii) Net weight	kgs	

3.1.17 Electric Hoist

S. No.	Description	Units	Particulars			
(a)	**Electric Hoist**		**MLR Pump Area**	**RASPS**	**Centrifuge Room**	**Chlorine Building**
	(i) Make					
	(ii) Type and class					
	(iii) Safe working Load	tonne				
	(iv) Hoist speed high/low	m/min				
	(v) Cross travel speed	m/min				
	(vi) Span	m				
(b)	**Hoisting Rope:**					
	(i) Diameter	mm				
	(ii) Construction					
	(iii) Quality of steel					
	(iv) Minimum Breaking Load	kgs				
	(v) Factor of safety					
(c)	**Motors for Hoist/ cross travel :**					
	(i) Make					
	(ii) Type					
	(iii) Rating	kW				
(d)	**Details of Brakes for Hoist/cross travel:**					
	(i) Make					
	(ii) Design Holding Torque	N-mm				
	(iii) Net weight	kgs				

3.1.18 Manual Hoists

Sr. No.	Description	Particulars					
		Sec. Scum Pit	**Centrifuge feed PS**	**Plant water Sump**	**Plant Drain Sump**	**Alum House**	**Polymer Dosing Area**
(a)	Capacity (tonnes)						
(b)	Quantity						
(c)	Class						
(d)	Lift (m)						
(e)	Span (m)						
(f)	Length of the runway (m)						
(g)	Hook type /						

Sr. No.	Description	Particulars					
		Sec. Scum Pit	**Centrifuge feed PS**	**Plant water Sump**	**Plant Drain Sump**	**Alum House**	**Polymer Dosing Area**
	Construction						
	- I.S. Specification No.						
	- Swivel type						
(h)	Wire rope construction and standard						
(i)	Specification/ Type of Rails for Long Travel						
(j)	**Painting**						
	- Type of primer coat						
	- No. of coats of paint						

3.1.19 Submersible Pump Set

S. No.	Description		Units	Particulars		
				Plant Water	**Plant Drain**	**Treated Effluent**
(a)	(i)	Tank capacity	cum			
	(ii)	Tank Dimensions	mm			
(b)	**Pump**					
	(i)	Pump Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)	Nos.			
	(v)	Capacity	m^3/s			
	(vi)	Head	mlc			
	(vii)	Shut off Head	metres			
	(viii)	NPSH required	metres			
	(ix)	Submergence required	metres			
	(x)	Efficiency	%			
	(xi)	Absorbed power at duty point	kW			
	(xii)	Motor rating	kW			
	(xiii)	Speed	rpm			
(c)	**Material of construction:**					
	(i)	Casing				

S. No.	Description		Units	Particulars		
				Plant Water	**Plant Drain**	**Treated Effluent**
	(ii)	Impeller				
	(iii)	Shaft				
	(iv)	Mechanical Seal				
	(v)	Lifting Chain and Guide Bar				
	(vi)	Cooling Jacket				
	(vii)	Discharge size	mm			
	(viii)	Suction size	mm			
	(ix)	Flange Drilling standard:				
	(x)	Weight (Pump + Motor)	kgs			
(d)	**Testing & Inspection:**					
	(i)	Pump performance testing standard				
	(ii)	Maximum Noise level	dB(A)			
	(iii)	Maximum velocity of vibration	mm/sec			
(e)	**Motor :**					
	(i)	Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)				
	(v)	Rating	kW			
	(vi)	Weight	kgs			

3.1.20 Gates [+]

S. No.	Description		Units	Particulars
(a)	(i)	Make		
	(ii)	Model		
	(iii)	Quantity (W+S)		
	(iv)	Service		
	(v)	Type		
	(vi)	Spindle Type		
	(vii)	Size	mm x mm	
	(viii)	Weight	kgs	
	(ix)	Seating Head	m	
	(x)	Unseating Head	m	
(b)	**Material of construction:**			
	(i)	Wall Thimble		
	(ii)	Gate		
	(iii)	Frame		
	(iv)	Spindle		
	(v)	Stem coupling		

S. No.	Description	Units	Particulars
	(vi) Seating face		
	(vii) Wedge		
	(viii) Headstock		
	(ix) Gear House cover & stem guide		
	(x) Lift Nut		
	(xi) Fasteners & Anchors		
	(xii) Lifting mechanism, Gear House & stem guide		
(c)	**Gate Actuators +**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Motor Rating	kw	
	(vii) Motor speed	rpm	
	(viii) Protection		
	(ix) Gear Reducer Make		
	(x) Type		

+Bidder to provide above details for each size of Gate and Service including modulating type of gates

3.1.21 Valves

S. No.	Description	Units	Particulars
(a)	**Butterfly valves:#**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	Material of construction		
	(ix) Body		
	(x) Disc		
	(xi) Sealing face		
	(xii) Shaft		
	Gear Reducers		
	(i) Make		
	(ii) Material		
	(iii) Flange Drilling standard		
(b)	**Butterfly Valve Actuators #**		
	(i) Make		
	(ii) Type		

S. No.	Description	Units	Particulars
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Motor rating	kW	
	(vii) Design Torque	N-m	
	(viii) Time for full open to full close	seconds	
(c)	**Non-return valves** #		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test Pressure	bar	
	(ix) Design standard		
	(x) Flange drilling standard		
	Material of construction:		
	(i) Body		
	(ii) Disc/plates		
	(iii) Spring		
	(iv) Shaft		
(d)	**Sluice valves :**#		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	Material of construction		
	(ix) Body		
	(x) Gate		
	(xi) Sealing face		
	(xii) Shaft		
	Gear Reducers		
	(i) Make		
	(ii) Material		
	(iii) Flange Drilling standard		
(e)	**Sluice Valve Actuators** #		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	

S. No.	Description	Units	Particulars
	(v) Design Torque	N-m	
	(vi) Time for full open to full close	seconds	
(h)	**Knife Gate valves :#**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number		
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers :		
	(xv) Make		
	(xvi) Material		
	(xvii) Flange Drilling standard		
(i)	**Knife Gate Valve Actuators #**		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	kg-m	
	(vi) Time for full open to full close	seconds	

Bidder to provide above details for each size, type of Valve and Service

3.1.22 Gravity Thickeners

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Size (Diameter x SWD x FB)	m	
	(v) Scraper speed	rpm	
	(vi) Peripheral Velocity	m/s	
	(vii) Design Torque	N-m	
	(viii) Feed rate per thickener	cum/hr	
	(ix) Feed well size	mm	
	(x) Walkway (width x Height)	mm	
	(xi) Weir plate size (Thick x width)	mm	
(b)	**Surface preparation & protection:**		
	(i) Wetted parts		
	(ii) Exposed parts		

S. No.	Description	Units	Particulars
(c)	**Material of construction:**		
	(i) Bridge and Superstructure		
	(ii) Feed well		
	(iii) Shaft		
	(iv) Walkway Gratings		
	(v) Squeegees		
	(vi) Weir plate		
	(vii) Clamps & Hardware		
(d)	**Motor :**		
	(i) Motor Rating	kW	
	(ii) Motor Speed	rpm	
	(iii) Make		
	(iv) Protection		

3.1.23 Sludge Pumps

S. No.	Description		Units	Particulars	
				Thickened sludge	**Centrifuge feed**
(a)	(i)	Make			
	(ii)	Type			
	(iii)	Model			
	(iv)	Quantity (W+S)			
	(v)	Capacity	cum/hr		
	(vi)	Head	mlc		
	(vii)	Efficiency	%		
	(viii)	Max. Solid size	mm		
	(ix)	Speed	rpm		
	(x)	Motor rating	kW		
(b)	**Material of construction :**				
	(i)	Casing			
	(ii)	Rotor			
	(iii)	Stator			
	(iv)	Line shaft			
	(v)	Sealing			
	(vi)	Base Plate			
(c)	**Construction Features**				
	(i)	Protection			
	(ii)	Flange drilling standard			
	(iii)	Suction diameter	mm		
	(iv)	Discharge diameter	mm		
	(v)	Coupling type/make			
(d)	**Motor**				
	(i)	Make			
	(ii)	Motor rating	kW		

S. No.	Description		Units	Particulars	
				Thickened sludge	**Centrifuge feed**
	(iii)	Motor speed	rpm		
	(v)	Insulation class			
	(vi)	Enclosure			
	(vii)	Voltage & Frequency			

3.1.24 Polyelectrolyte Dosing Pumps

S. No.	Description	Units	Particulars
(a)	**Pumps**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model		
	(v) Capacity max/min	l/s	
	(vi) Head	mlc	
	(vii) Stroke adjustment	mm	
	(viii) Stroking speed max/min	spm	
	(ix) Casing material		
	(x) Diaphragm material		
	(xi) Shaft material		
	(xiii) Motor rating	kW	
	(xiv) Motor Make		
(b)	**Polyelectrolyte preparation Tank:**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Size (Diameter x Height)	m x m	
	(v) Material of construction		
(c)	**Polyelectrolyte Solution Agitator**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)		
	(v) Motor rating	kW	
	(vi) Motor speed	rpm	
	(vii) Mixer speed	rpm	
	(viii) Impeller material		
	(ix) Shaft material		
	(x) Solids recovery		

3.1.25 Centrifuges

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)	Nos.	
	(v) Feed rate per centrifuge	cum/hr	
	(vi) Mass feed rate		
	(vii) % dried solids		
	(viii) Noise level (dBA) at 1m distance from the machine	dB(A)	
	(ix) Vibration level		
	(xi) Bowl Diameter	mm	
	(xiii) Bowl length	mm	
	(xiv) Taper Angle	degrees	
	(xv) Bowl speed	rpm	
	(xvi) Centrifugal force	Kgf	
	(xvii) Gear Box ratio		
	(xviii) Overall Dimension	mm	
	(xix) Weight (Centrifuge + Motor)	kgs	
	(xx) Protection of centrifuge		
(b)	**Material of Construction:**		
	(i) Bowl		
	(ii) Scroll		
	(iii) Blade		
	(iv) Scroll lead face protection		
	(v) Casing-Upper & Lower		
	(vi) Wear protection		
(c)	**Motor :- Main Drive**		
	(i) Make		
	(ii) Motor rating(Main Drive)	kW	
	(iii) Motor speed	rpm	
	(iv) Make of Motor		
	(v) Insulation class		
	(vi) Enclosure		
	(vii) Voltage & Frequency		
(d)	**Motor -Back drive**		
	(i) Make		
	(ii) Motor rating	kW	
	(iii) Motor speed	rpm	
	(iv) Make of Motor		
	(v) Insulation class		
	(vi) Enclosure		
	(vii) Voltage & Frequency		

3.1.26 Belt Conveyor system

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	nos	
	(v) Capacity	Kgs/min.	
	(vi) Length of conveyor	m	
	(vii) Angle of Inclination		
	(viii) Belt width	mm	
	(ix) Jointing detail/type		
	(x) Belt rating		
	(xi) Belt speed		
	(xiii) Belt scraper-Type / No.		
(b)	**Motor**		
	(i) Make	`	
	(ii) Rating	kW	
	(iii) Speed	rpm	
	(iv) Insulation class		
	(v) Enclosure		
	(vi) Voltage & Frequency		

3.1.27 Cake Hopper

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Capacity	Kgs/min.	
	(v) Dimensions	mxm	
	(vi) Material of Construction		
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
	(iii) Speed	rpm	
	(iv) Insulation class		
	(v) Enclosure		
	(vi) Voltage & Frequency		

3.1.28 Air-conditioning Equipment (For SCADA Room)

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Capacity	TR	
	(v) Quantity	Nos.	
	(vi) Motor Rating	kW	
	(vii) Air-Ducting :		
	(viii) Material		
	(ix) Size		
	(x) Quantity		
	(xi) Whether all the required accessories are provided	Yes/No	

3.1.29 Disc Filters

Sr. No.	Description		Units	Particulars
(a)	**General**			
	(i)	Make		
	(ii)	Type		
	(iii)	Quantity (W+S)	Nos	
(b)	**Performance**			
	(i)	Tertiary Filter		
	(ii)	Design capacity MLD	MLD	
	(iii)	No. of units/streams	Nos	
	(iv)	Design Capacity	MLD	
	(v)	No. of Filter Discs	Nos	
	(vi)	Max. Submergence	%	
	(vii)	MOC OF Filter Media		
	(viii)	MOC of Filter Frame		
	(ix)	MOC of Segment Frame		
	(x)	MOC of center Drum		
	(xi)	MOC of Main body (Frame)		

	(xii)	Filter Media Pore Size	microns	
(c)	**Filter Drive Unit**			
	(i)	Type of drive		
	(ii)	No. of drive unit	Nos	
	(iii)	Gear Ratio		
	(iv)	Rated Power	kW	
	(v)	Power Supply		
	(vi)	Motor Poles		
(d)	**Suction Cleaning Pump**			
	(i)	Type		
	(ii)	No. of pumps	Nos	
	(iii)	Capacity	m3/hr	
	(iv)	Head	M	
	(v)	Rated Power	kW	
	(vi)	Power Supply		
	(vii)	Motor Poles		

3.1.30 Gates for Disc filtration System

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Service		
	(v) Type		
	(vi) Spindle Type		
	(vii) Size	mm x mm	
	(viii) Weight	Kgs.	
	(ix) Seating Head	m	
	(x) Unseating Head	m	
(b)	**Material of construction:**		
	(i) Wall Thimble		
	(ii) Gate		
	(iii) Frame		
	(iv) Spindle		
	(v) Stem coupling		
	(vi) Seating face		
	(vii) Wedge		
	(viii) Headstock		

S. No.	Description	Units	Particulars
	(ix) Gear House cover & stem guide		
	(x) Lift Nut		
	(xi) Fasteners & Anchors		
	(xii) Lifting mechanism, Gear House & stem guide		
(c)	**Gate Actuators +**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Motor Rating	kW	
	(vii) Motor speed	rpm	
	(viii) Protection		
	(ix) Gear Reducer Make		
	(x) Type		

+Bidder to provide above details for each size of Gate and Service

3.1.31 Butterfly Valves

Sr. No.	Item		Unit	Description
(a)	**General**			
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Quantity		
	(vi)	Size	mm	
	(vii)	Rating	bar	
	(viii)	Test pressure	bar	
	(ix)	Body material		
	(x)	Disc material		
	(xi)	Sealing face material		
	(xii)	Shaft material		
	(xiii)	Gear Reducers:		
	(xiv)	Manufacturer		
	(xv)	Material		
	(xvi)	Flange Drilling standard		
(b)	**Valve Actuators**			
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		

Sr. No.	Item		Unit	Description
	(iv)	Service		
	(v)	Quantity		
	(vi)	Motor rating	kW	
	(vii)	Design Torque	Kg-m	
	(viii)	Time for full open to full close	minutes	

3.1.32 Sluice valves

Sr. No.	Item		Unit	Description
(a)	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Number	Nos.	
	(vi)	Size	mm	
	(vii)	Rating	bar	
	(viii)	Test pressure	bar	
	(ix)	Body material		
	(x)	gate material		
	(xi)	Sealing face material		
	(xii)	Shaft material		
	(xiii)	Gear Reducers		
	(xiv)	Manufacturer		
	(xv)	Material		
	(xvi)	Flange Drilling standard		
(b)		**Sluice Valve Actuators**		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Number	Nos.	
	(iv)	Motor rating	kW	
	(v)	Design Torque	Kg-m	
	(vi)	Time for full open to full close	minutes	

3.1.33 Propeller Exhaust Fan

S. No	Description		Units	Particulars
(a)	**Fan**			
	(i)	Make		
	(ii)	Make		
	(iii)	Model		
	(iv)	Impeller diameter	mm	

S. No	Description	Units	Particulars
	(v) Impeller speed	rpm	
	(vi) Capacity	cum/hr	
	(vii) Static pressure	mmlc	
	(viii) Shaft power	W	
	(ix) Fan total efficiency	%	
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
(c)	**Overall weight**	kg	

3.1.34 Service Water Pumps

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Service/Location		
	(iv) Quantity (W+S)	Nos.	
	(v) Capacity	cum/hr	
	(vi) Head	mlc	
	(vii) Efficiency	%	
	(viii) Power absorbed	kW	
	(ix) Speed	rpm	
	(x) Motor rating	kW	

3.2 Mechanical Works TSPS

3.2.1 Mechanically Raked Medium Bar Screen – TSPS

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Type		
(b)	**Screen**		
	(i) Width	mm	
	(ii) Height	mm	
	(iii) Bar size (front x back x depth)	mmxm mxmm	
	(iv) Clear space between bars at front end	mm	
	(v) Type or raking arrangement		
	(vi) Raking speed	m/min	
	(vii) Motor rating	kW	
(c)	**Materials of Construction**		
	(i) Frame		
	(ii) Rake carriage		
	(iii) Screen bars		
	(iv) Tines		
	(iv) Fasteners		
	(v) Canopy		
(d)	**Screw Conveyor System**		
	(i) Make		
	(ii) Material		
	(iii) Speed	rpm	
	(iv) Motor rating	kW	
(e)	**Unit Control Panel**		
	(i) Make		
	(ii) Circuit breaker rating	A	
	(iii) Over all dimensions	mm x mm x mm	
	(iv) Degree of protection		
	(v) Timer		
	• Make • Type		

3.2.2 Trash Rack (J-type coarse screen) for TSPS

Sr. No.	Description		Units	Particulars
	Design			
(a)	**Quantity (W)**		Nos	
	Size		L x B X SWD + FB	
	Screening Quantity		Cum	
(a1)	**General**			
	(i)	Make		
	(ii)	Model		
	(iii)	Quantity (W+S)	Nos.	
	(iv)	Type		
(b)	**Trash rack**			
	(i)	Clear Spacing	mm	
	(ii)	Width	mm	
	(iii)	Height	mm	
	(iv)	Guide Rail Height	m	
	(v)	lifting arrangement	per min	
	(vi)	Water Level	m	
	(vii)	Inclination Angle	degree	
(c)	**Materials of Construction**			
	(i)	Frame		
	(ii)	Guide rail		
	(iii)	lifting arrangement		

3.2.3 Electrically Operated Hoist–Trash Screens

S. No.	Description	Units	Particulars
(a)	**Make**		
	(i) Crane		
	(ii) Chain pulley block		
	(iii) Trolley		
(b)	**Crane**		
	(i) Capacity-SWL	Tonne	
	(ii) Type		
	(iii) Lift	m	
	(iv) Span	m	
	(v) Hook approach	m	
	(vi) Rail size	kg/m	
	(vii) Crane girder size	mm	

S. No.	Description	Units	Particulars
	(viii) Type of brake		
	(ix) Motors for Hoist/Long travel/cross travel :		
	(a) Make		
	(b) Type		
	(c) Rating	kW	

3.2.4 Gates+ (Inlet & Outlet Sluice Gates for Screen Channel, Inlet Sluice gate to Wet well, Isolation Sluice gate for Wet well, Weir Gate for Over Flow)

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Service		
	(v) Type		
	(vi) Spindle Type		
	(vii) Size	mm x mm	
	(viii) Weight	kgs	
	(ix) Seating Head	m	
	(x) Unseating Head	m	
(b)	**Material of construction:**		
	(i) Wall Thimble		
	(ii) Gate		
	(iii) Frame		
	(iv) Spindle		
	(v) Stem coupling		
	(vi) Seating face		
	(vii) Wedge		
	(viii) Headstock		
	(ix) Gear House cover & stem guide		
	(x) Lift Nut		
	(xi) Fasteners & Anchors		
	(xii) Lifting mechanism, Gear House & stem guide		
(c)	**Gate Actuators +**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Motor Rating	kW	
	(vii) Motor speed	rpm	

S. No.	Description	Units	Particulars
	(viii) Protection		
	(ix) Gear Reducer Make		
	(x) Type		

+Bidder to provide above details for each size of Gate and Service

3.2.5 Non Clog Submersible Sewage Pumps -TSPS

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Type		
(b)	**Performance**		
	(i) Capacity	cum/hr	
	(ii) Total Head	mlc	
	(iii) Efficiency	%	
	(iv) Maximum pump input at 50Hz for single pump operation	kW	
	(v) Shut off Head	mlc	
	(vi) Rated Speed	rpm	
	(vii) Size of solids that can be handled	mm	
(c)	**Design/Construction**		
	(i) Type of Impeller (enclosed / semi open)		
	(ii) No. of Impeller vanes	nos	
	(iii) Impeller Diameter	mm	
	(iv) NPSHR	m	
	(iv) Minimum submergence required	mm	
	(v) Surface hardness of shaft sleeve	BHN	
	(vi) Discharge size	mm	
	(viii) Weight	kg	
(d)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Motor housing		
	(v) Cooling Jacket		
	(vi) Mechanical Seal (motor side)		
	(vii) Mechanical Seal (pump side)		

S. No.	Description	Units	Particulars
	(viii) Auto coupling with integral bend		
	(ix) Lifting chain		
	(x) Guide pipe		
	(xi) Guide Bracket		
	(xii) Fasteners		
(e)	**Testing and Inspection**		
	(i) Pump Performance testing Standard		
(f)	**Performance**		
	(i) Maximum velocity of vibration	mm/sec	
	(ii) Maximum noise level	dB(A)	

Note : TSPS-Terminal Sewage Pumping Station

3.2.6 Submersible Induction Motor - TSPS

S. No.	Description	Units	Particulars
(a)	Make		
(b)	Quantity (W+S)	Nos.	
(c)	Rating	kW	
(d)	Speed	rpm	
(e)	Type of Starter		
(f)	Efficiency • Full Load • ¾ Load	 % %	
(g)	Power Factor • Full Load • ¾ Load		
(h)	Class of Insulation		
(i)	Starting method		
(j)	Temperature rise by resistance method	°C	
(k)	Type of enclosure		
(l)	Degree of protection		
(m)	Cooling arrangement for motor		

3.2.7 Electrically Operated Hoist–Wet Well

S. No.	Description	Units	Particulars
(a)	**Make**		
	(i) Crane		
	(ii) Chain pulley block		
	(iii) Trolley		
(b)	**Crane**		
	(i) Capacity-SWL	Tonne	
	(ii) Type		
	(iii) Lift	m	
	(iv) Span	m	
	(v) Hook approach	m	
	(vi) Rail size	kg/m	
	(vii) Crane girder size	mm	
	(viii) Type of brake		
	(ix) Motors for Hoist/Long travel/cross travel :		
	(a) Make		
	(b) Type		
	(c) Rating	kW	

3.2.8 Valves

S. No.	Description	Units	Particulars
(a)	**Non-return valves #**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test Pressure	bar	
	(ix) Design standard		
	Material of construction:		
	(i) Body		
	(ii) Disc/plates		
	(iii) Spring		
	(iv) Shaft		
	(v) Flange drilling standard		
(b)	**Knife Gate valves :#**		
	(i) Make		
	(ii) Type		
	(iii) Model		

S. No.	Description	Units	Particulars
	(iv) Service		
	(v) Number		
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) Gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers		
	(xv) Gear Make		
	(xvi) Gear Material		
	(xvii) Flange Drilling standard		
(c)	**Knife Gate Valve Actuators** #		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	N-m	
	(vi) Time for full open to full close	Seconds	

Bidder to provide above details for each size, type of Valve and Service

3.2.9 Dewatering Pumps for TSPS

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Service/Location		
	(iv) Quantity (W+S)	Nos.	
	(v) Capacity	cum/hr	
	(vi) Head	mlc	
	(vii) Efficiency	%	
	(viii) Power absorbed	kW	
	(ix) Speed	rpm	
	(x) Motor rating	kW	

3.2.10 Propeller Exhaust Fan

S. No	Description	Units	Particulars
(a)	**Fan**		
	(i) Make		
	(ii) Make		

S. No	Description	Units	Particulars
	(iii) Model		
	(iv) Impeller diameter	mm	
	(v) Impeller speed	rpm	
	(vi) Capacity	cum/hr	
	(vii) Static pressure	mmlc	
	(viii) Shaft power	W	
	(ix) Fan total efficiency	%	
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
(c)	**Overall weight**	kg	

3.2.11 Valves in Pumping Main

S. No.	Description	Units	Particulars
(a)	**Knife gate valve in Pumping Main**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers :		
	(xv) Make		
	(xvi) Material		
	(xvii) Flange Drilling standard		
(b)	**Knife Gate Valve Actuators** #		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	N-m	
	(vi) Time for full open to full close	Seconds	
(c)	**Air Valve in Pumping Main**		
	(i) Make		
	(ii) Type		
	(iii) Number	Nos	
	(iv) Size	mm	
	(v) Rating	PN	
	(vi) Test pressure	bar	
	(vii) Body material		
	(viii) Float Material		
	(ix) Nozzle Material		

S. No.	Description	Units	Particulars
(d)	**Gate valve in Pumping Main**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers :		
	(xv) Make		
	(xvi) Material		
	(xvii) Flange Drilling standard		

3.2.12 Service Water Pumps

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Service/Location		
	(iv) Quantity (W+S)	Nos.	
	(v) Capacity	cum/hr	
	(vi) Head	mlc	
	(vii) Efficiency	%	
	(viii) Power absorbed	kW	
	(ix) Speed	rpm	
	(x) Motor rating	kW	

3.3 Process and CIVIL Units

S. No.	Units	STP
3.3.1	**General and Process for STP and TSPSs**	

S. No.	Units	STP
1	Total head loss (m) in STP (from water level in STP Inlet Chamber to water level in CCT Effluent Channel) at peak flow with one unit of each process with multiple units out of service	
	(i) Lean Flow	
	(ii) Average Flow	
	(iii) Peak Flow	
	(iv) Peak flow with one unit of each process unit(s) out of service.	
3.3.2	**Sewage Treatment Plant**	
1)	STP Inlet Chamber	
	(i) Size of channel, L*B*D (m)	
	(ii) Size of incoming pumping main (m)	
	(iii) No. and size of gated openings weir gates	
	(iv) Max, Average, and Min water levels (m)	
2)	Fine Screen Channels	
	(i) No. of units	
	(ii) Capacity of each unit (MLD)	
	(iii) Size of channel, L*B*D (m)	
	(iv) Max, Average, and Min water levels (m)	
	(v) Head loss (m)	
3)	Fine Screen Effluent/ Grit Basin Distribution Channel	
	(i) Size of channel L*B*D (m)	
	(ii) No. and size of gated openings and type of gates – Screen Effluent	
	(iii) No. and size of gated openings and weir gates – Grit Basin Influent	
	(iv) Max, Average, and Min water levels (m)	
4)	Vortex Grit Chamber	
	(i) Particle size to be removed (mm)	
	(ii) Specific gravity	
	(iii) Efficiency of removal (%)	
	(iv) Size of grit basin influent structure (m)	
	(v) Grit Basins - Number - Capacity, each MLD - Size, each, upper portion, Dia*D (m) - Size, each, lower portion, Dia*D (m)	
	(vi) Vortex Velocity (m/s)	
	(vii) Max, Average, and Min water levels in grit chamber m)	
5)	Grit Basin Effluent Channel/Parshall Flume Channel	
	(i) Size of channel (m)	

S. No.	Units	STP
	(ii) No. and size of gated openings and type of gates	
	(iii) Max, Average, and Min water levels (m)	
	(iv) Size of Bypass channel/pipe (m), Material of Construction	
	(v) Size of Parshall Flume (m)	
6)	Aeration Basin Flow Distribution Box and Influent Channel to Aeration Basin	
	- Size of channel - No. of distribution branches - Size of each branch, L*B*D (m) - No. and size of gated openings and weir gates (m) - Max, Average, and Min water levels (m)	
7)	Aeration Basins	
	(i) - No. of basins - Length-to-width ratio for each basin	
	(ii) Process info - Total volume (m^3) - Total HRT (Hrs) - Total SRT (days) - Anaerobic SRT (days) - Anoxic SRT (days) - Aerobic SRT (days) - Overall Length and Width for all basins (m) - Overall F/M ratio (Kg BOD removed/ Kg MLVSS/ day) - Mixed Liquor Recycle (MLR) ratio - MLR "From" and "To" locations - Return Activated Sludge (RAS) ratio - RAS "From" and "To" locations	
	(iii) Anaerobic Zones - No. of zones per basin - Volume per basin (m^3) - Total anaerobic volume (m^3) - Anaerobic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Anaerobic MLSS (mg/l) - Anaerobic MLVSS (mg/l)	

S. No.	Units	STP
	(iv) Anoxic Zones - No. of zones per basin - Volume per basin (m^3) - Total Anoxic volume (m^3) - Anoxic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Anoxic MLSS (mg/l) - Anoxic MLVSS (mg/l)	
	(v) Aerobic Zones - No. of zones per basin - Volume per basin (m^3) - Total Aerobic volume (m^3) - Aerobic length-to-width ratio for each basin - Aerobic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Aerobic MLSS (mg/l) - Aerobic MLVSS (mg/l)	
	(vi) De-Aeration Zones - No. of zones per basin - Volume per basin (m^3) - Total volume (m^3) - Side-Water Depth (SWD) (m)	
	(vii) Hydraulic info - Aeration basin internal baffle weir elevations (m) - Max, Average, and Min water levels in all zones (m)	
8)	Aeration Basin Effluent Channel	
	- Size of channel, L*B*D (m) - No. and size of gated openings and weir gates (m)	
9)	Process Air Blower Building (i) Inside dimensions of blower room (Length x Width) (m) (ii) Inside dimensions of panel room (Length x Width) (m) (iii) Area allocated for loading / unloading (m^2) Height of Building (m)	
10)	Secondary clarifier(s) Distribution Structure	

S. No.	Units	STP
	- No. of branches - Size of each branch box L*B*D (m) - Type of arrangement for equal dist. of flow - No. and size of gated openings and weir gates (m)	
11)	Secondary clarifiers - No. of clarifiers - Capacity, each (MLD) - Diameter, each (m) - Surface area each (m^2) - Total HRT (Hrs) - Side water depth (m) - Surface overflow rate at average flow ($m^3/m^2/day$) - Surface overflow rate at peak flow ($m^3/m^2/day$) - Solids loading rate at average flow ($Kg/m^2/day$) - Bottom floor slope - Diameter of Inlet Pipe (From distribution structure to Centre column (mm) - Diameter of centre column (mm) - Diameter of Feed Well (m)	
12)	Secondary Pump House	
	(i) Dia. (mm) and length (m) of rising main for RAS (ii) Dia. (mm) and length (m) of rising main for WAS (iii) Size of Pump House Building , L*B*H (m) (iv) All building slab elevations (m)	
13)	Disc Filters	
	(i) Number of tanks	
	(ii) Size of Disc Filter Inlet Channel, L*B*H (m)	
	(iii) Size of Disc Filter Channel, L*B*H (m)	
	(iv) Size of Disc Filter Outlet Channel, L*B*H (m)	
	(v) No. and size of gated openings and weir gates (m)	
	(vi) Size of bypass channel/pipe (m), Material of Construction	
14)	Chlorine Contact Tank Influent Channel and flow distribution box - Size of channel - No. of branches - Size of each branch box L*B*D (m) - No. and size of gated openings and weir gates (m)	
15)	Chlorine Contact Tank(s)	

S. No.	Units	STP
	(i) Number of tanks	
	(ii) Volume of each tank (m^3)	
	(iii) Total hydraulic retention time (all tanks) at peak flow (min.)	
	(iv) Overall Length and Width of all tanks (m)	
	(v) No. of passes per tank	
	(vi) Pass width (m)	
	(vii) Max, Average, and Min water depth (m)	
	(viii) Total length of travel of liquid per tank (m)	
	(ix) Effective length-to-width ratio	
16)	Chlorine Contact Tank Effluent Channel	
	- Size of channel (m) - No. and size of gated openings and weirs or gates (m) - Length and size, invert level of final effluent pipe/conduit to disposal point (m) - Size of outfall structure L*B*D (m)	
17)	Chlorination Building (i) Inside dimensions of chlorinator room (m) (ii) Inside dimensions of chlorine tonner room (m) Area allocated for loading / unloading (m^2) (iii) Height of Building (m)	
18)	Chemical Building (i) Inside dimensions of alum storage room (m) (ii) Inside dimensions of alum solution tank room (m) Area allocated for loading / unloading (m^2) (iii) Height of Building (m)	
19)	Gravity Sludge Thickener Distribution Structure (As Applicable Refer Part 5)	
	- Size of inlet chamber (m) - No. of branches - Size of each branch,, L*B*D (m) - No. and size of gated openings and weir gates (m)	
20)	Gravity sludge thickeners - No. of thickeners - Diameter each (m) - Surface area each (m^2) - Side water depth (m) - Surface overflow rate ($m^3/m^2/day$) - Solids loading rate ($Kg/m^2/day$) - Bottom floor slope	

S. No.	Units	STP
21)	Centrifuge Feed Sump	
	(i) Sump inside dimensions, L*B*H (m)	
	(ii) Top slab elevations (m)	
	(iii) Dia. (mm) and length (m) of Sludge pipe	
22)	Centrifuge Feed Pump House	
	(i) Building inside dimensions, L*B*H (m)	
	(ii) All building slab elevations (m)	
	(iii) Dia. (mm) and length (m) of rising main	
23)	Centrifuge Building (G+1)	
	(i) Building inside dimensions, L*B*H (m)	
	(ii) All building slab elevations (m)	
24)	Scum Pit	
	(i) Sump inside dimensions, L*B*H (m)	
	(ii) Top slab elevations (m)	
	(iii) Dia. (mm) and length (m) of Scum pipe	
25)	Over Flow Chambers	
	(i) Chamber inside dimensions, L*B*H (m)	
	(ii) Top slab elevations (m)	
	(iii) Dia. (mm) and length (m) of Over Flow pipe	
26)	Treated Water Sump and Pumping Station	
	(i) Full dimensions of structure (m)	
	(ii) All structural slab elevations (m)	
	(iii) Dia. (mm) and length (m) of rising main	
27)	Plant Drain Sump and Pumping Station	
	(i) Full dimensions of structure (m)	
	(ii) All structural slab elevations (m)	
	(iii) Dia. (mm) and length (m) of rising main	
28)	Admin Building (G+1)	
	(i) Inside Dimensions of building (m x m) (ii) Inside Dimensions of office room (m x m) (iii) Inside Dimensions of SCADA room (m x m) (iv) Inside Dimensions of laboratory room (m x m) (v) Inside Dimensions of conference hall (m x m) (vi) Inside Dimensions of administrative room (m x m) (vii) Inside Dimensions of store room (m x m) (viii) Inside Dimensions of Pantry/Kitchen (m x m) (ix) Inside Dimensions of Toilet (m x m) (x) Inside Dimensions of other room if any (m x m) (xi) Height of Building (m)	
29)	Maintenance Workshop/ Store room	
	(i) Inside Dimensions of Maintenance Workshop/Store room (m x m)	

S. No.	Units	STP
	(ii) Height of Building (m)	
30)	Area allocated for transformer yard (m^2)	
31)	Size of Electrical Sub-Station (m x m x m)	
32)	Size of DG set room (m x m x m)	
33)	Width and Height of entrance gate (m) and wicket gate (m) with arrangement for cow guard	
34)	Length and Height of Compound Wall-Total, L*H (m)	
35)	Size of security Room (m x m x m)	
36)	Area allocated for green belt (m^2)	
37)	Area allocated for two wheeler and four wheeler parking (m^2)	
38)	Width and length of approach road to site (m)	
39)	Width and length of roads inside the plant (m)	
40)	Internal drainage, water supply, and waste water disposal	
	(i) Storm water drain (size, length in m)	
	(ii) Water Supply and Sewerage Provision - Capacity and size of water storage tank (m^3) - Capacity and size of overhead tank (m^3) - Capacity and size of septic tank (if required) (m^3)	
	(iii) Nos. and size of Culverts, road crossing, etc.	
41)	Reclamation / Site Development – As Applicable	
	(i) Proposed area of Reclamation (m^2)	
	(ii) Top levels after Reclamation (m)	
	(iii) Average depth of filling (m)	
	(iv) Total quantity of earth required (m^3)	
	(v) Side slope of the filling	
	(vi) Slope protection measures	
	(vii) Proposed compaction equipment to be deployed (Type and No.)	
	(viii) Test apparatus to be provided in field soil laboratory	
	(ix) Proposed open channel dimension - Top width (m) - Bottom width (m) - Side slope - Longitudinal slope - Length (m) - Height	

S. No.	Units	STP
	(x) Proposed Nalla Diversion Dimension - Top width (m) - Bottom width (m) - Side slope - Longitudinal slope - Length (m) - Height	
	(xi) Bottom slope protection for open channel	
	(xii) Proposed equipment (type and number) for excavation, handling, transporting	
	(xiii) Borrow pit - Name of the Location (s) - Area (m^2) - Type of soil in general	
42)	Miscellaneous	
	The Bidder shall list here details of any other / additional items required for a complete installation.	

Terminal Sewage Pumping Stations (TSPS)

3.3.3	Terminal Sewage Pumping Stations (TSPS)	TSPS
(a)	Diameter and Height of inlet manhole	
(b)	Coarse Screen Influent Channel	
	(i) Size of inlet channel (m)	
	(ii) Size of incoming sewer (m)	
	(iii) Nos. and size of gated openings and type of gates	
	(iv) Max, Average, and Min water levels (m)	
(c)	Coarse Screen Channels	
	(i) No. of units	
	(ii) Capacity of each unit in MLD	
	(iii) Size of channe,l L*B*D (m)	
	(iv) Clear opening of bars in screen at screen channel	
	(v) Max, Average, and Min water levels (m)	
	(vi) Head loss (mm)	
(d)	Coarse Screen Effluent Channel	
	(i) Size of inlet channel (m)	
	(ii) Nos. and size of gated openings and type of gates	
	(iii) Max, Average, and Min water levels (m)	
	(iv) Size of Plant Bypass	

3.3.3	**Terminal Sewage Pumping Stations (TSPS)**	**TSPS**
(e)	TSPS Wet Well inside dimensions and bottom slab invert elevation, all in meters	
(f)	TSPS Valve Chamber inside dimensions and bottom slab invert elevation, all in meters	
(g)	TSPS Superstructure dimensions (L/W/Dia, roof height) in meters	
(h)	Size of 11 KV Switch Gear room (m x m x m)	
(i)	Area allocated for transformer yard and 11 KV two pole structure (m^2)	